CREDENTIAL TRACKING

TECHNICAL FIELD

This specification generally relates to credential tracking.

BACKGROUND

A person may be associated with a credential that, for example, permits the person to access locations and/or events.

SUMMARY

In general, one aspect of the subject matter described in this specification may include the actions of storing, at a client device, a credential associated with a user identifier and a location, receiving, at the client device, a request to output a representation of the credential in a manner that enables a credential authority to validate the representation, responsive to receiving the request to render the representation of the credential, obtaining a location of the client device, determining that the location of the client device is within a predefined distance of the location associated with the credential, responsive to determining that the location of the client device is within the predefined distance of the location associated with the credential, storing, in a memory of the client device, data indicating that the user has entered the location associated with the credential.

Some implementations include the action of transmitting, from the client device to a server, a message indicating that the user has entered the location associated with the credential.

In some implementations, storing, at a client device, a credential associated with a user identifier and a location comprises storing, at a client device, a credential associated with a user identifier, a location, and a time. In addition, the actions may include obtaining a time at the client device responsive to receiving the request to render the representation of the credential, determining that the time at the client device is within a predefined time period associated with the credential, and responsive to determining that the location of the client device is within the predefined distance of the location associated with the credential and determining that the time at the client device is within the predefined amount of time of the time associated with the credential, storing data indicating that the user has entered the location associated with the credential at the time associated with the credential.

Some implementations include the action of transmitting, from the client device to a server, a message indicating that the user has entered the location associated with the credential.

In some implementations, determining that the location of the client device is within a predefined distance of the location associated with the credential comprises determining that the location of the client device is within a first predefined distance of the location associated with the credential, and responsive to determining that the location of the client device is within the predefined distance of the location associated with the credential, storing, in a memory of the client device, data indicating that the user has entered the location associated with the credential comprises responsive to determining that the location of the client device is within the first predefined distance of the location associated with the credential, storing, in a memory of the client device, data indicating that the user has entered the location associated with the credential. In addition, the actions may include, after determining that the location of the client device is within the first predefined distance of the location associated with the credential, determining that the location of the client device is beyond a second predefined distance of the location associated with the credential, and responsive to determining that the location of the client device is beyond the second predefined distance of the location associated with the credential, storing, in a memory of the client device, data indicating that the user has left the location associated with the credential.

Some implementations include the action of transmitting, from the client device to a server, a message indicating that the user has left the location associated with the credential. The first predefined distance may be the same as the second predefined distance.

Some implementations include the actions of determining that the client device lacks network connectivity, responsive to determining that the client device lacks network connectivity, caching a message indicating that the user has entered the location associated with the credential for subsequent transmission to a server when network connectivity is restored, determining that network connectivity has been reestablished, and responsive to determining that network connectivity has been reestablished, sending the cached message to the server.

Some implementations include the action of outputting, at the client device, the representation of the credential in a manner that enables the credential authority to validate the representation.

Other features may include corresponding systems, apparatus, and computer programs encoded on computer storage devices configured to perform the foregoing actions.

The details of one or more implementations are set forth in the accompanying drawings and the description, below. Other features will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

FIG. **1** is a diagram of an example system that enables tracking of users who enter locations and/or events.

FIG. **2** is a diagram of an example system that enables tracking of users who leave locations and/or events.

FIG. **3** is a messaging diagram that illustrates sample messages between a client device, server, and processing system in a system that enables tracking of users who enter and leave locations and/or events.

FIG. **4** is a flowchart of an example process for tracking users who enter and leave locations and/or events.

DETAILED DESCRIPTION

In some instances, it can be beneficial to generate representations of credentials for groups of users or for individuals. The credentials can be, for example, badges to gain entrance to a location or event, a ticket for entry to a location or event, a key that unlocks a lock (e.g., for entry to a location), etc. Furthermore, it may be advantageous to track users associated with these credentials as they enter and/or leave the locations and/or events. A location can be, for example, a venue where events are held, a private residence, a commercial space, a room, or any other physical space. An event can be, among other things, any gathering of people at a specified date, time, and location.

Credentials can be maintained on and/or accessed from computing devices (e.g., mobile computing devices like smart phones and tablet computers) and credentials can be represented in various forms as described below. For example, credentials can be represented by parametrically-